

Enduring Understanding # 1: Scientific inquiry affords all learners opportunities to make observations, pose questions, develop hypotheses, design and conduct investigations, and analyze data to draw conclusions.

Geology Benchmarks

Students will understand:	Essential Questions	Students will know the/that	Students will be able to	Notes
<p>1.1 Scientific theory is substantiated by valid evidence and logical arguments through ethical communication.</p> <p>1.2 Understanding validity and reliability are integral in understanding research.</p>	<p>-What is logical?</p> <p>-What does it mean in research to replicate something?</p> <p>-Why is a logical classification scheme based off of evidence important?</p>	<p>-Steps to scientific research</p> <p>-Scientific investigation often means repeating certain steps of the process.</p> <p>-Accurate conclusions are based off supporting evidence.</p>	<p>-Be deliberately curious and open in their observations.</p> <p>-Pose questions objectively based on those observations.</p> <p>-Develop a hypothesis.</p> <p>-Gather and analyze necessary and sufficient data.</p> <p>-Draw logical conclusions by thinking quantitatively.</p> <p>-Demonstrate ethical practices in their research which may include repeating certain steps to verify results.</p> <p>-Apply their understanding of logical argumentation as they defend their research results.</p> <p>-Write clear, step-by-step instructions for conducting investigations, operating something, or following a procedure.</p> <p>-Participate in group discussions on scientific topics.</p>	

Enduring Understanding # 2: Exploring systems, order, and organizations in our natural and designed world are integral to understanding the scientific disciplines and their interdependence.

Geology Benchmarks

Students will understand:	Essential Questions	Students will know the/that	Students will be able to	Notes
<p>2.1 Understanding the composition and interactions of the solid Earth is the foundation of geological sciences.</p>	<p>-Is the Earth solid?</p> <p>-What is a mineral?</p> <p>-What is a rock?</p> <p>-How are rocks formed?</p> <p>-Are systems responsible for rock formation?</p> <p>-Are these rock-forming systems related?</p>	<p>- Solid Earth consists of tectonic plates in motion that interaction.</p> <p>- Different physical and chemical properties used to identify minerals.</p> <p>- Difference between a mineral and a rock.</p> <p>- Three types of rocks and their interrelationships in the rock cycle.</p>	<p>- Explain the origin of igneous, sedimentary and metamorphic rocks.</p> <p>- Describe the physical and chemical properties used to classify minerals and rocks.</p> <p>- Identify different minerals and rocks from their physical and chemical properties.</p> <p>- Explain the difference between a mineral and a rock.</p>	<p>Chapters: 1 and 2</p>
<p>2.2 The mechanics of plate tectonics and the resulting</p>	<p>-In 500 million years if you want to go to Disney</p>	<p>- The solid Earth is dynamic.</p> <p>- Driving mechanisms</p>	<p>- Describe the theory of plate tectonics.</p> <p>-Compare and contrast plate</p>	<p>Chapters 7, 6, 8, and 9</p>

<p>features and events shape our dynamic Earth.</p>	<p>Land, how would you dress (plate tectonics)? -How did the ring of fire get its name (plate boundaries)? -Does Montana have earthquakes? -Why are there stromatolites (aquatic fossils) on the peaks in Glacier Park?</p>	<p>behind plate tectonics. - Fossils and rock correlation support the modern theory of plate tectonics. - Boundaries associated with earthquakes. - Types of boundaries associated with volcanic activity. - Difference between intrusive and extrusive volcanic features. - Events that lead to orogenesis.</p>	<p>tectonics to continental drift. - Identify the three primary plate boundaries. -Explain how earthquakes result from elastic rebound. - Locate epicenter from seismic readings. -Describe the major features produced by volcanic activity. -Correlate stresses involved with different types of orogeny.</p>	

Geology Benchmarks

Students will understand:	Essential Questions	Students will know the/that	Students will be able to	Notes
2.3 Geological time provides a scientifically supported chronological history of the Earth's geologic and biologic evolution.	-How old is the Earth? -How do fossils tell time? -How was the Earth formed?	- Some assumptions must be made to date the Earth. - Difference between radiometric dating and relative dating. - Geologic and biologic (fossil record) events leading to the formation of present day Earth.	- Describe the doctrine of uniformitarianism. - Explain the difference between radiometric and relative dating. - List and explain the law of superposition and the principle of original horizontality. -Explain rock correlation. - Describe the scientifically supported origin of Earth and the solar system. - List principle geologic and biologic events of Earth's history.	Chapters 10, 11 and Roadside Geology of Montana
2.4 The geological features that shaped Montana are still occurring today and have provided the abundant natural resources found throughout the state.	-How are geological processes responsible for Montana's unique landscape? -Who benefits from natural resources found in the state?	- Formation of the major landforms in Montana. -Types of natural resources found in the state.	-Use their knowledge of geology to determine the formation of different Montana landscapes and resource reserves. -Develop an opinion on the uses of natural resources in the state. -Explain the hydrological cycle and how it relates to Montana.	Chapters 3, 4, 5 and Roadside Geology of Montana

Enduring Understanding # 3: Both contemporary and historical scientific understandings inform technological, ethical, cultural and life decisions.

Geology Benchmarks

Students will understand:	Essential Questions	Students will know the/that	Students will be able to	Notes
3.1 Scientific knowledge and technological advances occur in response to natural inquiry.	-How have advances in technology lead to a greater understanding of geological systems?	- Uses of technologies have led to new discoveries and better understanding.	- Use modern technologies to investigate and report on a geological concept, idea, or system.	
3.2 Past and present geological investigations have influenced societal decisions regarding	-How has the past and present study of geology impacted ethics in society?	- Geological events that have influenced ethical decision making.	- Take a position on a controversial topic in geology and support your position using scientific findings. - Critically analyze a piece of	

ethics.			scientific media using scientific knowledge.	
3.3 Cultural and societal practices have contributed to our scientific knowledge that leads to informed decisions.	-How have cultural and societal practices influenced geological understanding?	-Geological understandings that have been influenced by Native American practices.	- Report how Native American practices are still relevant to geology.	